AEROCHARGER TURBO SYSTEM

INSTALLATION MANUAL

HARLEY-DAVIDSON FL-SERIES

Version 1.3

INTRODUCTION

Congratulations on your purchase of an Aerocharger Turbo system for Harley-Davidson FL-Series motorcycles!

You now own the most powerful, reliable, and technologically advanced turbo system in the world. With your new turbo system installed, you will experience substantial performance gains. Our unique system combines VATN technology with our frictionless, non-flooded ceramic ball bearing system, which provides zero lag performance.

This system is proudly made and assembled in the USA by Aerocharger LLC.

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WARNINGS AND DISCLAIMERS

Any aftermarket power-adding product can be dangerous to a vehicle if not used as directed. Aerocharger Turbo Systems are properly engineered, manufactured with high-quality components, and heavily tested to ensure best possible reliability. However, many factors that are out of our control, such as installation errors or misuse, can potentially cause damage. When properly installed and configured, this system should outlast the life of the vehicle. Please note the following warnings, carefully follow all instructions, and do not hesitate to contact an Aerocharger tech if you are unclear about any guidelines listed here.

INSTALLATION WARNING

If you are uncomfortable performing any installation procedure as described in this manual, please consult a trained professional at a qualified performance shop. If you are performing the installation of this system yourself, we recommend reading the entire manual before beginning the installation. We also suggest that you review your progress after each section to ensure that everything has been correctly installed.

MODIFICATION WARNING

This system is designed for use on a stock 2008+ Harley-Davidson FL-Series motorcycle with an undamaged, well-maintained engine. If your motorcycle is modified, consult with Aerocharger before proceeding.

Aerocharger is not responsible for ECU tuning and programming, but will provide assistance when possible.

ENGINE BREAK-IN WARNING

Installing turbo systems on brand-new vehicles is ***not recommended.*** New engines require a specific break-in procedure that does not factor in extra stress from forced induction. If the vehicle is new or has low miles, consult the dealership or owner's manual to determine the proper break-in procedure before continuing with this installation. Failure to do so can result in significant engine damage.

OCTANE:

For best performance and reliability, always use the recommended octane for your specific setup. See Appendix B for recommended octane. Always listen for signs of detonation. **IF DETONATION SHOULD OCCUR, OR YOU ARE UNSURE IF WHAT YOU ARE HEARING IS DETONATION, DECREASE THROTTLE IMMEDIATELY** and consult an Aerocharger technician. If the system is installed, configured, and operated correctly, detonation will not be an issue. Please note that inconsistencies on stock engines and parts are possible on any new vehicle from an OEM.

INTERNATIONAL OCTANE: Fuels are listed in this manual with the **AKI** octane rating commonly used at North American gas stations [(**RON+MON)/2**]. Fuels that are sold in Europe and other countries generally use the **RON** rating system. If you are located outside of North America, be sure to use the equivalent octane that is available in your region.

IMPORTANT NOTES

NOTE: Read and understand all safety and technical precautions in this manual before proceeding. Failure to comply with the instructions in this manual could result in personal injury, property damage, voided warranties, and inconsistent or poor performance from the turbocharger system. Contact Aerocharger with any questions or concerns.

DO NOT let any debris (hard or soft) enter air intakes or exhaust ports during installation of this turbo kit.

DO NOT use any silicone sealants except as directed in this manual. Silicone sealants can cause Foreign Object Damage to the turbo. **THIS WILL VOID YOUR WARRANTY.**

AEROCHARGER WILL NOT BE HELD RESPONSIBLE FOR DAMAGE TO THE VEHICLE'S POWERTRAIN.

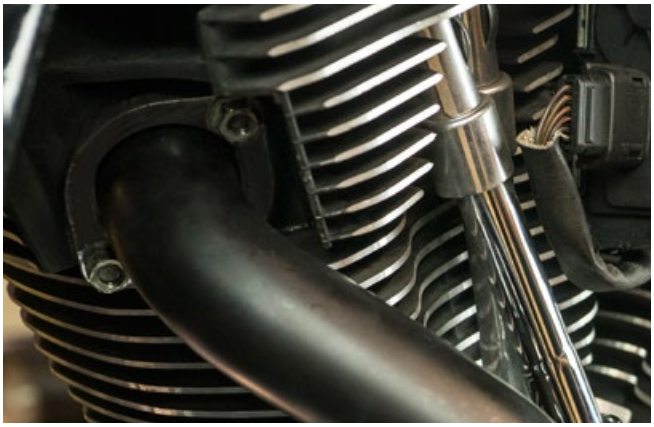
I. INSTALL THE HEADERS

1.1 Follow the factory service manual procedure to remove the motorcycle's seat, gas tank, bags, side panels and stock exhaust.

1.2 Remove the lower header mount bracket for ease of installation.

(Two 1/4" allen bolts)

1.3 Reuse the c-clamps from the stock headers on the new Aerocharger header pipes. Replace with new c-clamps if they are not in good condition - they must sit flat inside the manifold flange to prevent exhaust leaks.



1.4 Remove the tapered exhaust gaskets and install the flatter gaskets included in the kit. Loosely mount the Aerocharger header pipes to the engine exhaust manifold.

1.5 Re-attach the lower header mount bracket. Use blue Loctite on the 5/16 18 allen bolts and torque to factory spec.

1.6 Loosely mount the turbo support bracket to the chassis at the back of the header.

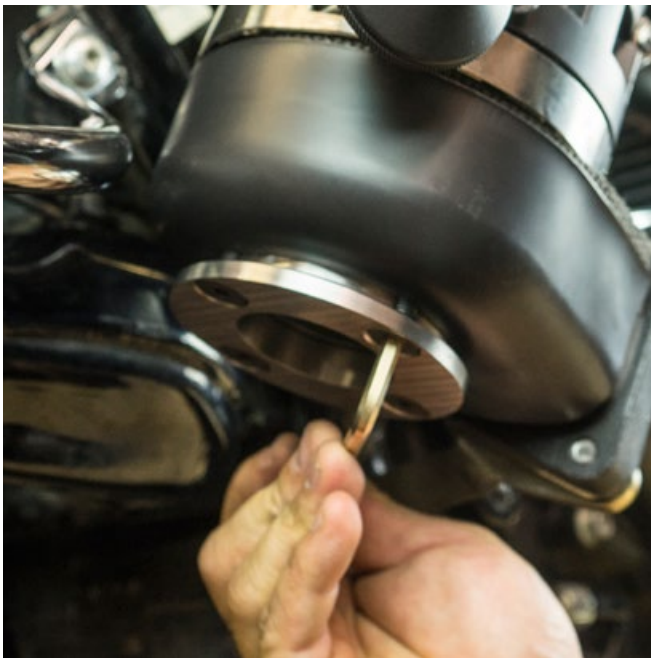
II. TURBO AND EXHAUST

2.1 Set up the Aerocharger turbo. Fill with the required amount of turbo oil: 1 bottle for a 53 Series, or 2 bottles for a 66 Series. Screw the fill plug back in, using thread lock fluid on the threads, and torque to 35 in-lbs. *(3/16" allen wrench)*

Refer to Appendix D for information about setting and maintaining the Aerocharger.

2.2 Install the filter on the compressor housing and tighten down the hose clamp to secure.

2.3 Before mounting the turbo, reinstall the bike's right-side plastic cover. Place the metal exhaust gasket on the turbo exhaust flange, then loosely bolt the turbo to the header using the included hardware. Use the longer bolts on the bottom to pass through the turbo support bracket.



2.4 Bolt the afterpipe flange to the turbo through the heat shield.

2.5 Place the retaining collar over the afterpipe, then attach the afterpipe to the flange on the turbo. Tighten down.

2.6 Attach the boost signal line to the fitting on the Aerocharger controller bonnet, and secure with a small zip tie. Without pinching the line, gently secure it with a zip tie to the bag support and run the line up to the center frame. (See Appendix F.)

2.7 Place bolts through the rear mounting tab on the afterpipe. Attach the afterpipe to the stock bracket on the rear bag mount, and tighten securely.

2.8 With the turbo, headers and afterpipe installed, firmly snug up all bolts and connections. Tighten the engine exhaust studs first to prevent exhaust leaks

III. FUEL CONTROLLER

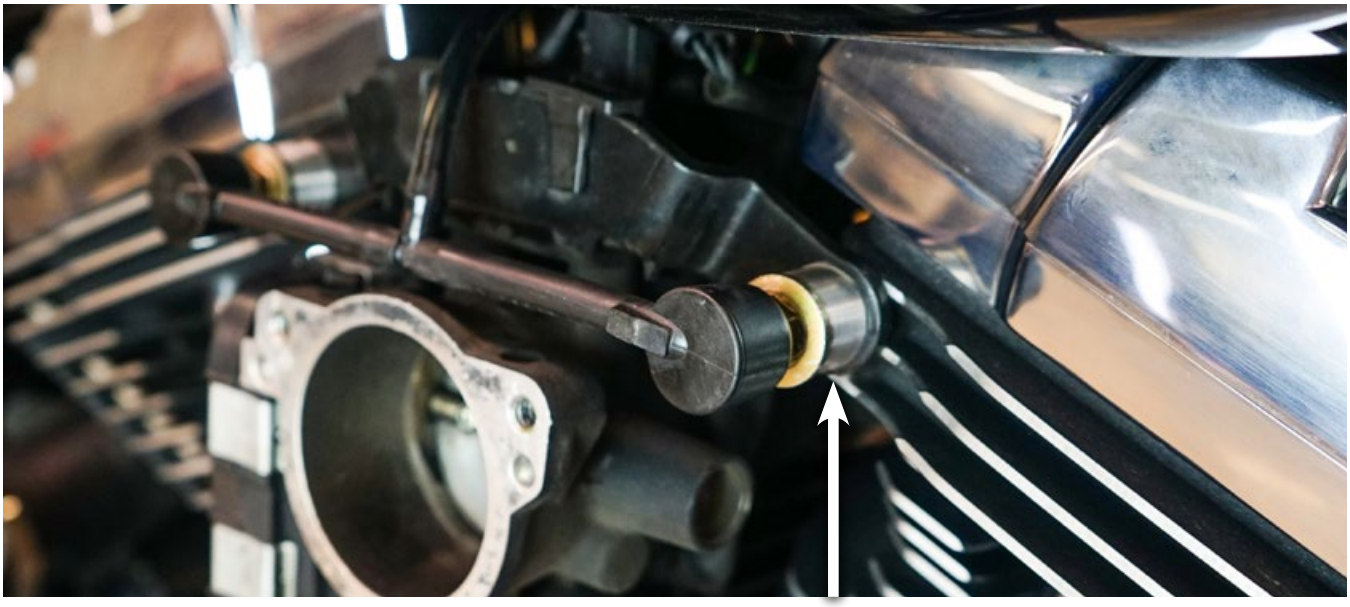
With the tank, bags and panels removed, the fuel controller can be installed at this time. See Appendix E for fitment recommendations.

Fuel controllers are sold separately - most Harley-Davidson owners will want to use their preferred fuel controller with this turbo system. Installation and features will vary, and additional dyno tuning will be required to set the controller up on the motorcycle. Contact an Aerocharger tech or a dyno tuning specialist for information and recommendations.

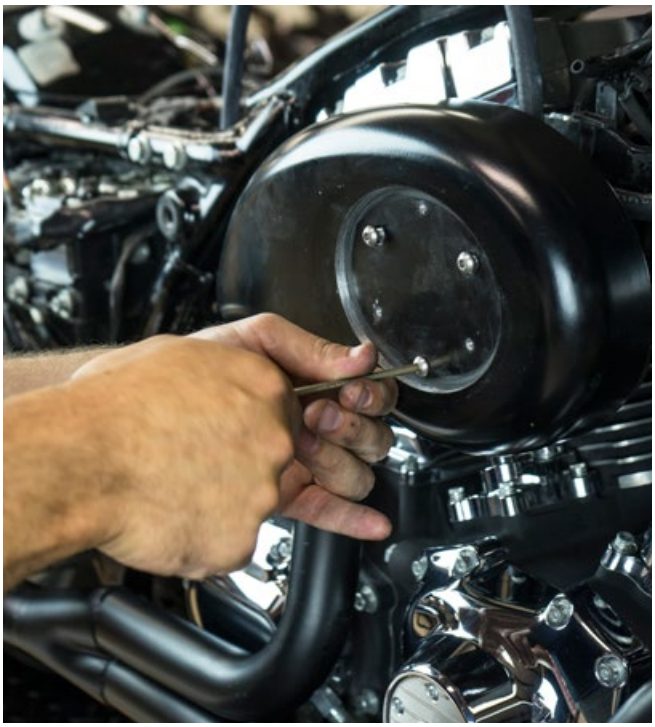
The fuel controller's oxygen sensor can be installed into this bung on the afterpipe.

Secure the o2 sensor plug to the frame with zip ties. Route the wiring along the frame towards the fuel controller.

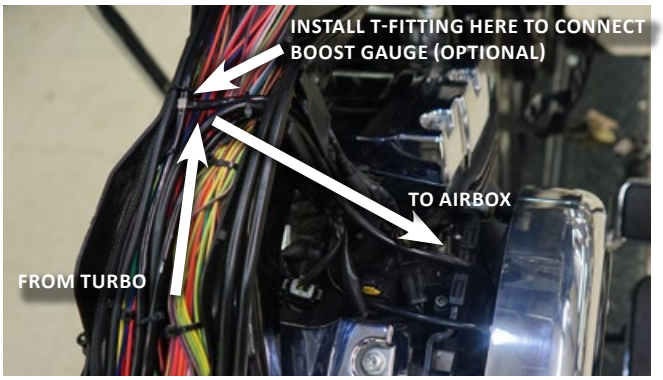
IV. AIRBOX INSTALLATION

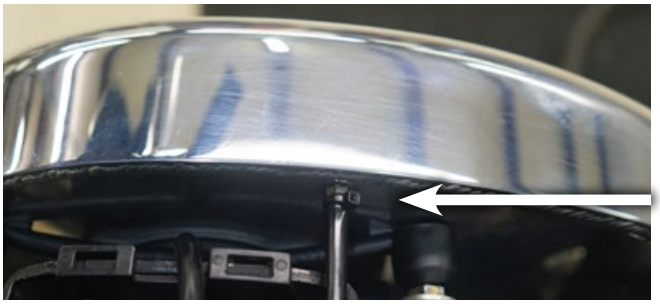


4.1 Remove the breather fittings from the cylinders, and install the included spacers. Refit the bolts with blue Loctite and torque to factory spec. Then snap the crankcase vent tube assembly onto the breather fittings. Run the breather hose along the center frame toward the swingarm.



4.2 Using the new throttle body gasket included in the kit, install the Aerocharger airbox onto the motorcycle's throttle body. Use blue Loctite on the threads and torque to 110 inch.lbs.





4.3 Route the boost signal line from the turbo along the center frame, and attach it to this fitting on the back of the airbox with a small zip tie. (See Appendix F.) Carefully secure this line along the frame with zip ties, taking care not to pinch the line.

4.4 Screw the airbox cover into the recess on the airbox with the provided hardware.

V. CHARGE TUBE (NON-INTERCOOLED)

5.1 ***FOR NON-INTERCOOLED SYSTEMS:*** Attach the silicone charge tube directly from the turbocharger compressor outlet to the airbox. The charge tube's blow-off valve will be closest to the airbox, facing inward. A reference line will connect the blow-off valve to the throttle body and fuel controller's MAP sensor. (See Appendix F)

NOTE: Be careful about clamp placement to avoid scratching finishes. Always use blue Loctite on bolts that do not have lock washers.

VI. INTERCOOLER AND CHARGE TUBES

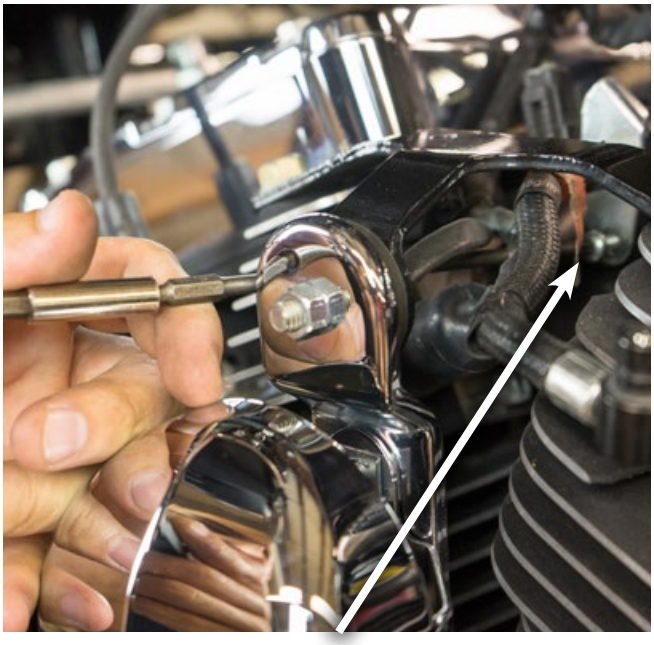
6.1 ***FOR INTERCOOLED SYSTEMS:*** Bolt the intercooler's front bracket to the frame above the left passenger foot peg. Then clamp the rear bracket to the bag support frame. Use the inner rubber grommet to protect the finish on the frame, and use thread-lock fluid on all bolts.

NOTE: Be careful about clamp placement to avoid scratching finishes. Always use blue Loctite on bolts that do not have lock washers.

6.2 Attach the silicone charge tube with the Blow-Off Valve to the airbox and intercooler outlet. The BOV end will be closest to the airbox, with the BOV facing inward. Secure with hose clamps. A reference line will connect the blow-off valve to the throttle body and fuel controller's MAP sensor. (See Appendix F)

6.3 Route the other silicone charge tube under the swingarm. Attach it to the Aerocharger compressor outlet and the lower intercooler inlet. Tighten the hose clamps.

VII. REPLACE INJECTORS



7.1 Disconnect the injector retaining bracket with a 27mm Torx screwdriver. Unplug the injector connectors, and pull out the injectors with their harness. Unclip the wires at the plastic connector - never disconnect by pulling on the wires.

7.2 Replace the stock injectors with the larger injectors included in the kit. When plugging them in, use gasoline or a very small amount of silicone grease to lubricate the injector o-rings.

7.3 Reinstall the injector harness and retaining bracket. Connect the injectors to the fuel controller if required. Make sure the connection is fully seated and clicks in place. Install the injector rail at the same time to avoid pinching the o-rings. Use blue Loctite on the retaining bracket screw.

VIII. FINAL REASSEMBLY

8.1 With the fuel controller installed, review the entire installation. Verify that all wiring and lines are cleanly routed, and that all connections are secure.

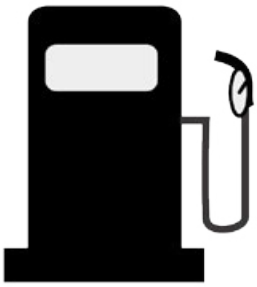
8.2 Follow the factory service manual procedure to reinstall the gas tank, seat, bags, side panels, and all other parts that have been removed during the installation of this turbo system.

This completes the installation. If required, the motorcycle may now be taken to a qualified dyno service for tuning.

APPENDIX

A. OCTANE

The Aerocharger turbo system for Harley-Davidson motorcycles has been designed to operate on 91 octane fuel available at any gas station. Higher octane fuel may be required depending on engine mods.



NOTE: At single-hose gas pumps, the first 1.5 to 2 gallons of fuel out of the line will be the grade of octane pumped by the previous customer. A mix of lower-grade fuel will reduce the total octane and possibly cause detonation.

B. ENGINE UPGRADES

This Aerocharger system is upwardly expandable, and is able to accommodate engine upgrades for increased horsepower output. It is important to note that some aftermarket engine parts will not work in harmony with this system. A poor combination of powertrain variables can reduce system efficiency and cost the vehicle in overall horsepower. Consult an Aerocharger technician for recommendations on components that work well with Aerocharger-specific applications.

C. VEHICLE MAINTENANCE

Any aftermarket power-adding product can accelerate wear on a vehicle. However, when properly configured, operated, and maintained, the turbo system should outlast the life of the vehicle. Do not neglect the normal maintenance schedule for your vehicle and pay attention to its tune and performance, and the Aerocharged motorcycle will easily be capable of thousands of boosted miles.

D. AEROCHARGER MAINTENANCE

BOOST SPRINGS

Aerocharger boost springs are used to set the boost pressure. Every Aerocharger is shipped with a green 5 PSI spring already installed. Available springs include:

5 PSI	GREEN	8 PSI	BLUE ORANGE
6 PSI	GREEN BLUE	9 PSI	ORANGE
7 PSI	BLUE	11+ PSI	BLACK

SPRING SHIMS

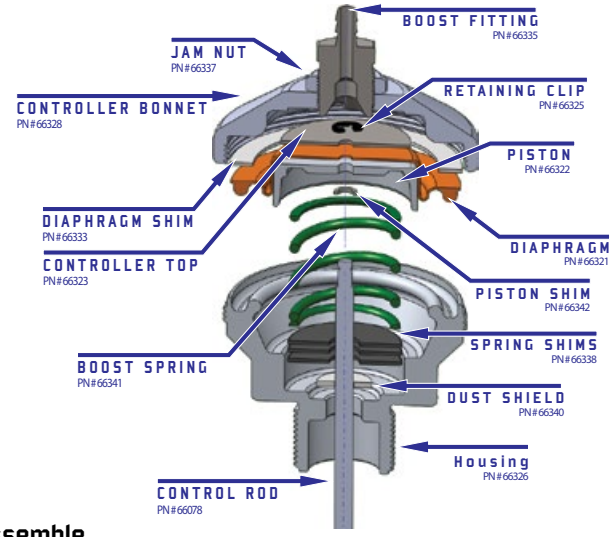
Shims can be added to the springs to increase the boost in increments of about .5 to . 75 PSI.

AEROCHARGER OIL

Specialized oil for ultra-high rpm machinery. Only use genuine Aerocharger Turbo Oil. The wrong oil can lead to bearing failure.

NOTE: NEVER attempt to disassemble the main Aerocharger housings. The bearing and vane systems require specialized tools to take it apart without damaging it. Contact Aerocharger for all service and repairs.

The Aerocharger is a sophisticated and highly efficient variable vane turbocharger. Unlike conventional turbos, it does not require oil pumps or lines. The Aerocharger will not need more maintenance than any other turbo - this graphic contains information for adjusting the Aerocharger to ensure best performance.



INTEGRATED BOOST CONTROLLER

The Integrated boost controller on the Aerocharger is a simple mechanical actuator where pressure in a chamber pushes against a spring to move the vanes. It can be easily disassembled to adjust the boost by changing springs and/or shims. Manual & electronic boost controllers are compatible with Aerocharger systems, but are not recommended.

OIL LEVELS

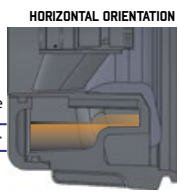
Aerochargers consume oil throughout their use. The amount of oil consumed is very small, and the oil level must only be checked once a year or every 30,000 miles. Aerocharger oil never has to be changed - only added. There is no benefit to changing the oil unless it has been contaminated with a foreign substance, such as if the vehicle has been underwater for a long time.

CHECKING OIL LEVEL

Remove the fill plug and use a zip tie as a dip stick to measure the oil level.

Oil should be added if the level is lower than .5" (1.3 cm.)

Oil is full at 1" height (2.5 cm.)

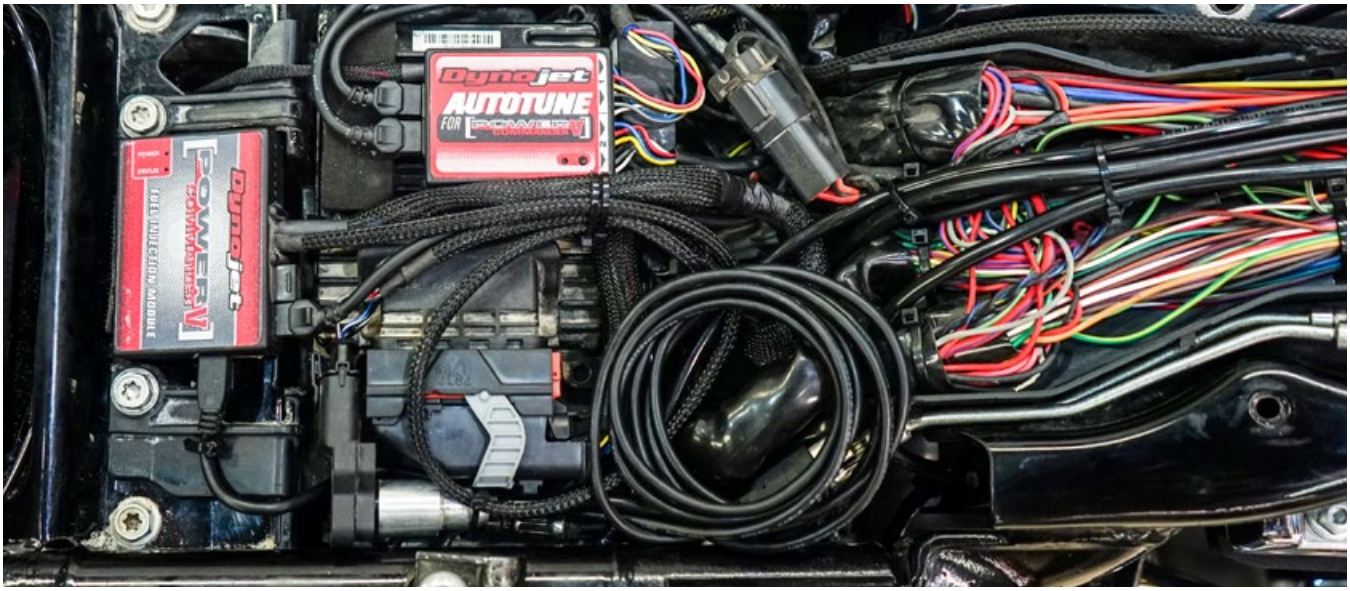


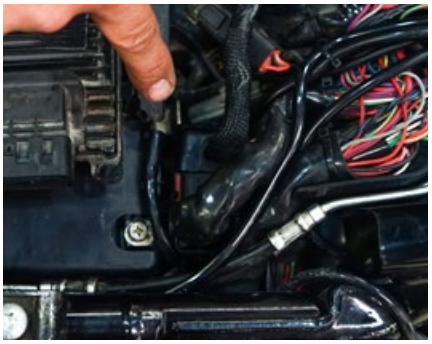
Use red thread lock fluid on the threads when replacing the fill plug and tighten down securely .

VISIT AEROCHARGER.COM TO SEE A VIDEO TUTORIAL ABOUT ADJUSTING THE AEROCHARGER'S BOOST CONTROLLER TO AFFECT TURBO RESPONSE

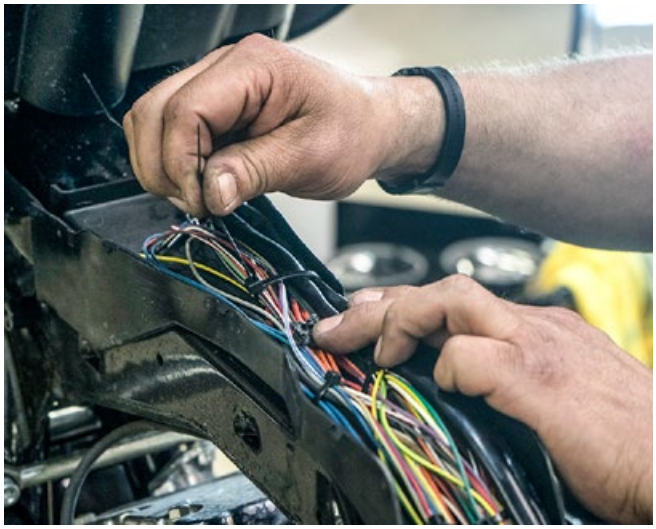
E. FUEL CONTROLLER FITMENT

It is important to cleanly route all lines for the turbo system and fuel controller. Take care that all lines are located so they will not pinch, rub, burn or tear. Make sure that the ECM and electrical plugs connect securely. It is a good idea to dress all excess line with plastic ties to keep them neat and out of the way. Proper fitment will reduce the risk of wear and damage, and give the install an OEM appearance.





Suggested fitment under the seat for 2008-15 models. The stock electronics tray has been notched out to fit the Power Commander unit. Several clips have been filed to add space for the ECU bridge connectors.



Secure all loose wires with zip ties.

The stock wire tray plastic can be notched to pass the boost signal line through.

F. SIGNAL LINE ROUTING PICTORIAL

WARNING: Do not pinch any boost or vacuum line. Do not replace vacuum lines with soft rubber lines. Secure all lines to their fittings with small zip ties. Poor performance or damage can occur when lines are pinched or come loose.

From the Blow-Off Valve, connect one arm of the vacuum reference line to the throttle body. Connect the other arm to the fuel controller's MAP sensor.

Run the boost signal line from the turbo's controller along the frame directly to the fitting on the Air Plenum.

A T-fitting can be installed into the boost signal line to provide signal for a boost gauge (optional).

Visit us online at www.AEROCHARGER.com for more technical resources, such as:

- Digital versions of manuals and field guides
- Detailed video of installations to refer to during your install
- Up-to-date tips, tricks, and upgrades

WE WANT TO SEE YOUR AEROCHARGER BUILD!

1. Shoot some video or take a picture
2. Post it online. Be sure to tag #Aerocharger
3. Get featured on our website or Facebook!

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